



Contents lists available at ScienceDirect

Journal of Forensic and Legal Medicine

journal homepage: www.elsevier.com/jflm

Postcard

Ethanol-based hand cleansers

In the July issue of 2008 JFLM Alcimedes correctly reported that exposure to ethanol-based hand cleansers does not produce measurable levels of plasma ethanol. Be that as it may, some ethanol is absorbed, even if it is below limits of detection, and some of that ethanol is converted to a minor metabolite known as ethyl glucuronide.¹ On this side of the pond, at least, the presence of ethyl glucuronide is considered a marker for ethanol consumption, and it is. But just as pubs are not the only source of lager, drinking is not the only source of ethanol ethyl glucuronide (EtG).

This was first noticed in 2006 when the Wall Street Journal (a business newspaper) ran a page article reporting on problems with the measurement of ethyl glucuronide in the urine.² Large commercial testing laboratories were promoting such measurement as a way to identify people who are drinking, even if they have not been drinking for several days. This is a very important issue for those enrolled in rehabilitation and drug diversion programs, and those in zero tolerance situations, where drinking is not allowed at all. The Wall Street Journal described the case of a nurse in rehabilitation who had lost her job because she had tested positive for EtG.

When Quest laboratories first introduced the test a spokesman for that company declared “EtG is not detectable in urine unless an alcoholic beverage has been consumed.” Quest was hardly the only company making claims. The web site of FirstLab, in North Wales Pennsylvania claimed, “Since EtG is only created during the metabolism of alcohol, there is no potential for a wrong result due to external contamination.”

But many drug experts, including the inventor of the test Dr. Gregory Skipper at the University of Alabama, and Dr. Westly Clark, director of the federal Substance Abuse and Mental Health Services Administration (SAMHSA) center for substance treatment, concluded that any alcohol in the environment could cause a positive test; knowing that EtG is produced in the presence of alcohol is not at all the same thing as knowing that alcohol had been consumed.

These observations led the US SAMHSA to issue a warning about the test October 12,³ 2006. SAMHSA warned “The EtG (ethyl glucuronide) urine test, often used to detect alcohol use among individuals legally prohibited from drinking because of their job or parole status, is “inappropriate” as the sole basis for a definitive, life-altering decision... and that doing so was ‘scientifically unsupported’ as the sole basis for legal or disciplinary action”.³

EtG is a very minor, but hardly the only very minor metabolite of ethyl alcohol. The amount formed is said to represent only a small fraction (<0.1%) of the ethanol dose ingested. EtG is detectable in living subjects for about 8 h longer in blood than ethanol can be and about 30 h longer than ethanol can be detected in urine.⁴

Unfortunately, alcohol is in the environment, especially in the environment of health care workers who use hand sanitizers every day. Today, at what may turn out to be the first phase of an influenza epidemic, use of alcohol-containing hand cleaners has increased dramatically, even among those not involved in the health care profession. It follows that many more positive tests will result. Hand sanitizers are made from alcohol gels. They have gained popularity because they are convenient and easy to use, and because alcohol works immediately and effectively to kill bacteria and most viruses. The higher the strength of the solution (i.e. 95%), the more chance there is that it will work. And, since alcohol gels work by stripping away the outer layer of oil on the skin, they are almost guaranteed to make their way into the body.

The woman described by the Wall Street Journal was a nurse who had been an alcoholic, but who was then in a diversion program. She swore that she was not drinking, but when her urine was tested it was positive for the glucuronide. When the test was first introduced, commercial laboratories claimed that urine ethyl glucuronide concentrations greater than 100 ng were proof of alcohol ingestion, even though that assumption had never been tested in a controlled study. Because her doctors believed the nurse and not the commercial laboratories, they did any experiment. They locked the nurse in a closed metabolic ward and had her wash her hands with Purell™ many times each day. Urine testing showed EtG concentrations of up to 750 ng/mL.

EtG bears the same relationship to alcohol as morphine does to poppy seeds. If you eat poppy seeds you will test positive for morphine. The only question is how much, which is why there is no “zero tolerance” testing for opiates. Experience has shown that the presence of opiates in the urine may be an innocent finding, which is why US law requires urinary morphine concentrations of more than 2000 ng/mL before a test can be called positive. The same consideration applies when testing for alcohol or its metabolites.

Obviously, sensible cutoffs need to be set for these minor alcohol metabolites, and it is equally obvious that 100 ng/mL is not the appropriate one. It is not just the users of hand cleansers we must worry about. Mouthwash is mostly alcohol too. We do not want to be firing too many people just because their breath smells good. Worse, as SAMHSA pointed out, we could find ourselves discriminating against bachelors careless enough to leave a carton of apple juice for a bit too long. But before cutoffs can be set, somebody needs to do some experiments and see just how much “innocent alcohol” gets converted.

Conflict of interest statement

No conflict of interest declared.

References

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Available online 19 May 2009